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GRADUATE SCHOOL
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PHYSICAL EDUCATION,

AS INFLUENCED BY THE

ARRANGEMENTS OF THE SCHOOL-ROOM.

AN ADDRESS,

DELIVERED BEFORE THE SOCIETY OF TEACHERS AND FRIENDS OF
EDUCATION IN NEW JERSEY, AT THEIR QUARTERLY
MEETING AT NEW BRUNSWICK, JUNE, 1847.

BY

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PREFACE.

THE following Essay was originally prepared as a report on the subject of which it treats, at the request of a committee of the "Society of Teachers and Friends of Education in New Jersey," and subsequently delivered as an Address before the Society, at the request of the same committee. The simple design, in its preparation, was to bring to the notice of Teachers, and others concerned in the business of Education, some considerations, drawn from well-known principles of human physiology, in reference to the influence they might exert on the physical health, while directing the mental discipline of the youth committed to their care. Possessing little claim (beyond the intrinsic importance of the subject) to the attention, it would not have been thus presented to the public, had it not been urged by those for whose benefit it was specially prepared, that its publication might, in some humble measure, aid them in their important, but ill-requited labours, and contribute to secure for them the co-operation of parents and the community at large, in regard to a department of their duties, in which countenance and support are greatly needed.

In accordance with the design of the Essay, the subject has been treated solely in reference to its bearing on the duties of teachers; and many topics of interest to the parent, which, in a systematic treatise on Physical Education, would claim attention, have been necessarily omitted. Some few of these that could be conveniently introduced, in connection with analogous duties of the teacher, have been appended in the form of notes, an arrangement which, it is hoped, may extend the usefulness of the Essay.

PHYSICAL EDUCATION.

If perfectibility may, in any sense, be predicated of the human creature, it can only be in reference to that state of equal and thorough development of his intellectual and physical organization which, under the laws of his constitution, is attainable by the proper use of the means suited to promote such development. To send forth upon the field of human action men thus perfected in their mental and physical endowment, ought to be the object of all of our systems of education; and every such system that has not due regard to both of these, should be considered essentially defective. The discipline of the intellect and, to some extent, the cultivation of the moral sentiments, have, from the early settlement of this country, received a commendable share of attention; but until a recent period, the direction of the circumstances which are adapted to promote the development of the physical frame, has formed no part of the prevalent systems, but been left entirely to unregulated impulse, accident and caprice. When it is considered that nearly one half of the child's wakeful time is usually spent in the school-room; and that, during that period, important vital functions are in constant operation, which cannot be performed in a healthy manner, unless under certain well-defined conditions of atmosphere, position and temperature; it will be readily imagined that evils of most grave character may be the consequence of inattention to these conditions, on the part of those to whom the education of the young is entrusted. Experience has abundantly proved that such is the fact; the origin of many a case of dyspepsia, of pulmonary disease, of habitual nervous irritability, and of spinal distortion, having been clearly traced to improper arrangements and habits adopted in the school-room. In view of the liability of these arrangements to produce such evils, the Committee, to whom this society has confided the presentation of subjects for its consideration and discussion, have thought it desirable that the attention of teachers be drawn to the subject of Physical Education; and it is in accordance with their desire that the following hints are presented.

Physical Education implies the development of the organic structures, on the aggregate performance of whose functions depend the phenomena of life. The animal organization is constantly undergoing a series of important changes; so that each individual organ of the body, though still retaining its identity, is, as regards the molecules of matter composing it, a different thing at maturity from the same organ as it existed in childhood. What is true of each organ is also true of the entire man. These changes, of which growth and development are the result, are effected by the correlative agencies of absorption and deposition. If the internal movements of a living human body could, at a given moment, be made the subject of sensible inspection, it would be found that the atoms composing it are successively abstracted by vessels adapted to the purpose, and carried by the circulation to the organs which are designed to eliminate them from the body; and that the waste of substance thus caused is repaired by a deposition of new matter from the blood, by means of an appropriate secreting structure. The blood would be found to obtain its supply of nutritive matter for this purpose, in a substance elaborated by the digestive apparatus, conveyed by absorbent vessels into the circulation, there intermingled with the general mass of the blood, carried through the lungs to undergo, with the blood, certain chemical changes by exposure to the atmospheric air, and then sent, by the action of the heart, to the various structures whose growth is to be promoted, and whose waste is to be repaired. It would occupy too much space, and it would not materilaly serve the object of this essay, to describe minutely the anatomical structure and the physiological action of the organs concerned in carrying on these various offices. What has now been stated will be sufficient to convey all the information necessary to an understanding of what shall be remarked in regard to the influences which, in the schoolroom, may disturb their action.

The functions of these several organs are mostly beyond the control of the will of the individual; though it is in his power, and in the power of those who govern his circumstances, by the regulation of his external relations, greatly to facilitate or hinder their healthy action. As has been seen, from what has been stated, the principal functions concerned in promoting the growth and development of the body are Digestion, the Circulation of the blood, Respiration, Nutrition—to which Absorption and Secretion are subservient—and Excretion. The external conditions on which these are dependent are Food, Air, Light, Temperature, Dress, Exercise, Positions of the body, Rest, Sleep, Cleanliness, and attention to the Excretions. Some of these are matters of concernment of the parent rather than the teacher; and though it might be useful to devote some attention to the consideration of these, the design of this essay will make it necessary to confine remark to those circumstances which are under the control of the teacher and those who direct the arrangements of the school-room. These it is now proposed to discuss.

I. Of the conditions which, in the school-room, may affect the function of Digestion.

The time for taking the daily meals, according to the usage of society, is such that the principal part of the process of digestion must be carried forward during the hours which are spent by the child in school. This process is effected by the joint instrumentality of secretory juices which dissolve, and of muscular action exerted on, the food while contained in the stomach, followed by the action of certain other organs contained within the walls of the abdomen. As these parts are very compressible, and as compression necessarily impedes muscular motion, and may abridge the freedom of action of the secretory vessels, it is obvious that the position of the body should be so regulated as to impose no restraint upon the organs contained within this cavity. Hence, the teacher will find it of essential service to his pupils, that their seats and desks be so constructed in regard to relative height, as not to lead to too great flexion of the body at the point of junction of the chest and the abdomen; and that the arrangement of the order of exercises of the school require frequent changes from the sitting to the upright posture, and from a state of quiet to one of active motion.

Digestion is greatly impeded by the indiscreet introduction of food into the stomach, before that which has been previously received is disposed of. Teachers should, therefore, strictly forbid their scholars to eat during the hours of school—a practice too often favoured by indulgent mothers, who, fearing that hard study will make their children hungry before the next regular meal, load their pockets with cakes and other niceties, to be eaten at recess, or whenever else they can steal opportunity.

Frequent drinking of water in large draughts proves injurious to digestion by distending the stomach and diluting its juices ; and is often indulged, not so much because the wants of nature require it, as from mischievous habit and the desire for respite from irksome study. It should always be discountenanced when excessive, and when really needed, permitted only in moderation. *

Indigestion from the exhaustion consequent on intense mental occupation, unrelieved by exercise, is a disease of literary manhood rather than of the youth at school. Yet the observing teacher will sometimes find, among his pupils, a youth of a highly nervous organization, united with a temperament of a mixed bilious and lymphatic character, whose perceptions are vivid, whose sensibilities are refined, and whose ambition is strong; ardent and persevering, when stimulated by devotion to a favourite study, but when excitement subsides, apathetic and morbid, disinclined to physical exertion, and manifesting a distaste for the active sports of his age. In such a youth, the development of dyspeptic symptoms would be a sad affliction; and the friendly counsels and timely restraints of a sympathizing teacher would be to him of inestimable value, and given at a period of life when the tendencies to disease are most under control, might rescue him from that species of dyspeptic hypochondria and melancholy, which has clouded so many bright prospects with gloom, and deprived society of genius and social qualities which might greatly have improved and adorned it.

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* The suggestions of the text are equally obligatory on parents. They will also do well to use great discretion in regard to the quantity, quality, and variety of the food in which they permit their children to indulge at their regular meals. Simplicity, in all these respects, is the only safe rule. A light dinner, plainly dressed, made of one article of the meat kind, and one, or at most two, varieties of vegetables, with bread, followed by a dessert of ripe fruit, without pastry, will meet all the demands of nature, and, unless pampered by previous bad habits, those of the appetite also. More than this, tends to repletion, distention, dyspepsia, and a long train of consequent evils. At the morning and evening meals, bread and butter, with milk, will be the suitable food ; warm bread, meats, rich cakes, and crude vegetables, should be forbidden ; and late suppers should, by the common consent of old and young, be regarded an abomination. Children should be required to masticate their food thoroughly, and be allowed plenty of time to do it; and violent exercise, both immediately before and after meals should be forbidden. Great errors are often committed in the direction of the diet of early infancy, by the substitution of paps, panados, and other artificial compounds, for that which nature has provided. These are a practical impeachment of her wisdom and a violation of her laws ; and the mother, who resorts to them to relieve herself of her appropriate duty, need not be surprised if flatulence, colics, constipation, and cholera infantum are the consequence.

II. The Circulatory system may be affected by the arrangements of the school-room.

This system is composed of the heart, which gives impulse to the blood; the arteries, which transmit it to the various parts of the body to repair its wastes, and to the several excretory organs, to eliminate from it noxious and redundant particles; and the veins which convey to the heart that part of the blood which, after these deposits, remains unexpended, and the new matter received through the absorbent system from the digestive organs, for its renovation. The influences which, in the school-room, may disturb the healthy performance of this function are, too great exaltation of temperature, violent mental emotion, intense study, and inconvenient bodily positions.

Though the human body is capable of sustaining very high degrees of temperature for short periods of time with impunity; and the fact is well established that persons have entered and breathed with little inconvenience, the atmosphere of rooms heated from 30° to 100° above the boiling point of water; it is a fact no less well established, that long-continued exposure to a degree of heat a little beyond that which is necessary for comfort, is productive of very pernicious effects. These effects are seen, not so much in any direct injury to the organs of the circulation themselves, as in the influence which the increase of the heart's action, caused by a heated temperature, exerts on the animal functions. If the blood be sent to any part of the body in greater quantity and with greater force than are necessary for its nourishment, it acts as a powerful stimulant; and, by a law of the animal organization, that stimulation is followed by a corresponding depression. Hence, the exhaustion, the lassitude, want of energy and indisposition to study manifested in schools, where due attention has not been paid to maintaining a healthful temperature. But this is not the whole injury. This state of nervous depression operates as a powerful predisposing cause of disease; inasmuch as it diminishes the power of resisting the more direct application of morbific influences. The sudden transitions from one extreme of temperature to another are not, of themselves, the cause of the inflammatory affections attributed to "catching cold;" for when all the animal functions are in vigorous action, such transitions can be borne with impunity; but if these functions are depressed by any exhausting or debilitating circumstances, the exposure is almost sure to induce disease. And, it is not necessary, when this state of depression exists, that the exposure be sudden or complete: a draught of air through a crevice of the wall, door or window, may be equally as injurious when driven against a sensitive surface, as when the whole body is subjected to the sudden transition. These considerations, it is hoped, will impress the necessity of adopting some means of maintaining a moderate and uniform temperature in all our schools, and securing its equal diffusion through every part. This can be best done, probably, by hot air furnaces placed in a cellar or room underneath that occupied by the school, care being taken to provide for the admission of the external air; and to regulate the amount of heat, a thermometer should be provided for every school-house. The temperature best suited to health is from 65° to 68° Fahrenheit. *

Another influence which, in the school-room, may affect injuriously the circulatory system, is violent mental emotion. The increased frequency, of late years, of diseases of the heart, and the difficulty of ascertaining the causes of those enlargements and structural changes which it is often found to have undergone, render important the avoidance of all influences which may contribute to such fearful results. Generally, the cause will be found to lie in violent struggles to overcome some physical obstacle opposing the perfect accomplishment of its functions; but, as similar and often as violent struggles are caused by the attempt to suppress strong mental emotions, it is not improbable that these may be sometimes followed by the same consequences. At the more advanced periods of life, such results, and even death itself, from such a cause, are not of unfrequent occurrence; and there is great reason for the apprehension that, at the period of life when the muscular fibres of the heart have not yet attained their full vigour and firmness of texture, the indulgence of passionate emotions, and

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* The temperature of nurseries for young children is a subject in regard to which there prevails much practical error, and it therefore demands the serious attention of every parent. From an exaggerated estimate of the tenderness of infancy, an elevation of temperature is often maintained in the nursery which is oppressive to every adult who enters it. This is especially apt to be the case in houses heated by furnaces. The effect of this upon an infant is the same as that described in the text, viz: stimulation and increased susceptibility: hence the frequency of lung and throat inflammations, croup, &c., and the great mortality among young children from diseases of this class. There are few popular errors which the physician finds more difficulty in combating; and he is often compelled to see his best-directed remedies fail—and perhaps hear himself censured for their inefficiency—from the perverseness of parents and attendants in disregarding his directions in reference to temperature. No nursery should be without a thermometer, and the mercury in it should never be suffered to rise above 68°.

the use of injudicious and violent means to suppress them, may, by the struggles called forth, lay the foundation of serious lesion of an organ so manifestly excited by the moral sensibilities. If there is just ground for this apprehension, there is superadded to the reasons drawn from the moral effect of their indulgence, a further inducement for the teacher to weigh well and adopt cautiously his system of discipline, and to be especially careful to conform to the injunction given by the apostle to those in whose place he stands: "Fathers, provoke not your children to wrath."

The effect upon the circulatory system, of intense and protracted study, is rather secondary than direct; and is the result of a previous accumulation of sensorial power in the nervous system, which is the more immediate consequence of the intense mental occupation referred to. The observations which suggest themselves on this head may, therefore, with propriety, be reserved for that part of this essay which shall treat of the influence of the occupations of the school-room on the brain and nervous system.

The arrangements of the seats of children may be such as to oppose obstacles to the freedom of the circulation. If the seats be so constructed that the scholars' feet cannot rest on the floor, the lower part of the thigh will press with such force on the edge of the seat as to compress the large veins, check the progress of the blood returning to the heart, cause so great distention of the blood-vessels of the leg as to incommode the scholar, and if long continued, hazard the rupture of their delicate internal coats. If the seats are, at the same time, too narrow to support the whole length of the thigh, there may be danger of deformity of the limb, at a period of life when the bony structure is yet semi-cartilaginous and flexible. To avoid these evils, the seats of children at school should vary from 8 or 9 inches to 15 or 16 in height, and in width from 10 to 13 inches, according to the ages of the scholars.

III. The function of Respiration may be seriously injured, and its organs impaired by the exercises and condition of the school-room.

The uses of this function are, the elimination from the blood of its deleterious materials, and the introduction into it of new elements fitted to sustain animal life. This office is performed by the lungs, which alternately receive into, and expel from their cells, the air of the atmosphere; from which the blood, conveyed to the surfaces of these cells for the purpose, imbibes its vital properties, and into which it discharges its noxious particles. The lungs are fitted to perform this office by their endowment with great elasticity of structure, by which the capacity of their cells is diminished or enlarged, according as the cavity that contains them is contracted or expanded by the action of the muscles on the bones that form the chest. The conditions necessary for the healthy performance of this function are, therefore, suitable air and unrestrained freedom of thoracic expansion.

The constituent element of the atmospheric air, which imparts vital qualities to the blood, is oxygen gas. Of the other elements composing it, viz. nitrogen and carbonic acid, the one is positively poisonous, the other incapable of sustaining life; and both are consequently destructive. The relative proportions in which they exist in our atmosphere are about 21 parts of oxygen, 78 of nitrogen, and 1 of carbonic acid. According to the best calculations which can be made, says Liebig, it is ascertained that 35. 8. cubic inches of oxygen are added to the blood of a healthy man in a minute; and that, during the same time, a nearly corresponding volume of carbonic acid is exhaled from the lungs and added to the atmosphere; the quantity of nitrogen remaining but slightly, if at all, disturbed. If no provision existed for the restoration of the relative proportions of these elements, the deleterious properties would be gaining on the vital at each successive act of respiration; until the whole atmosphere around us, instead of imparting vigour to the animal functions, strength to the muscular system, and exhilaration to the nervous susceptibilities, would involve all animated nature in a pall of death. To guard against these changes in the chemical condition of the atmosphere, the beneficence of our Creator has contrived a compensating provision, by which the noxious principles imparted to the air by animal respiration become sources of vitality to the vegetable kingdom; and this, in its turn, restores an equivalent in a new supply of the vivifying principle of animal existence. In the construction of our school-houses and other edifices, public and private, our anxiety to guard against extreme depressions of temperature disposes us to overlook the importance of this compensating provision; and, with the exclusion of the cold air, we exclude also the means which Nature has provided for renovating the life-giving properties of the atmosphere. The destructive tendency of this neglect may, in some degree, be appreciated by estimating with what rapidity the oxygen gas is consumed in a room of the ordinary dimensions of our schoolrooms, by 30 or 40 persons abstracting from 15 to 20 cubic inches of this vital property every minute, and adding, at the same time, a like amount of carbonic acid. The average dimensions of our school-rooms are not, probably, greater than 25 feet in breadth, 35 feet in length, and 10 feet in height, giving an atmospheric area of 8750 cubic feet. The proportion of oxygen gas in this quantity of atmospheric air would be about 1-5th of its whole volume, that is, 1750 cubic feet. Such a school-room is made to accommodate about 40 scholars, each of whom consumes on the average about 15 cubic inches of oxygen per minute, or 75 cubic feet per hour; and the whole number 3000 cubic feet per hour. The whole amount of oxygen, according to this estimate, would be exhausted in 35 minutes, and its place supplied by the same quantity of carbonic acid gas. If a fire be kept burning in the room, there will be a still further consumption of oxygen, that gas being as necessary to maintain combustion as respiration. There will be, also, a further accumulation of deleterious principles from the gases exhaled from the surface of the bodies of the pupils, and generated by the decomposition of the moisture of the atmosphere coming in contact with anthracite coal, if that fuel be burned in the school-room. What would be the result of this state of things, unmitigated by the admission of pure air from without, and the expulsion of the impure from within, history has told us in the dreadful tragedy of the Black Hole of Calcutta. Fortunately, our architects have not yet been able, to make provision for ingress and egress, and for the admission of light, without leaving some small avenues for the entrance of air; and such is the tendency of the atmosphere to maintain its chemical equilibrium, that the very chinks and crevices, which the joiner cannot wholly avoid, are often the means, in spite of ourselves, of saving us from death. But these are not sufficient in rooms wherein children are assembled in large numbers; and whenever the teacher observes, in any considerable number of his pupils, evidences of lassitude and muscular exhaustion, pallor of the countenance, panting respiration, giddiness and confused vision, the absence of their usual clearness of mental perception, drowsiness or any of these symptoms; and especially if, at the same time, he feels any of these sensations gradually creeping upon himself, he may feel assured that it is his duty to give his scholars a recess, and to take immediate measures to purify the atmosphere of his school-room. To do this, it will not be sufficient to drop the window sashes; for, however well that expedient may serve to temper a heated atmosphere, it will not relieve it of those noxious gases which, in consequence of their greater specific gravity, accumulate in greatest density in the lower portions of the apartment. It would be well if, for the purpose of promptly relieving the air of these heavy and pernicious gases, openings were made in some convenient part of the floor,—as recommended for the school-houses in New England,—provided with slides or other contrivances, by which they could be closed or left free, as occasion should require; but, if no such provision be made, the door of the room should be frequently opened during school hours, and always during the recess.*

Temperature seems to have but little perceptible effect on the function of respiration, as the experiments of Fordyce, Blagden and others, in heated chambers, have abundantly proved; but the passage of heated air over the mucous surfaces of the windpipe and its sub-divisions, and of the air-cells of the lungs, by causing a rapid evaporation of their moisture, will exhaust their secretory vessels, and so debilitate them as to induce great susceptibility of inflammation. The use of the vocal organs in long-continued speaking or reading, when the mucous surface is in such a debilitated condition, increases the exhaustion and still more exalts the susceptibility. To these circumstances as predisposing, and sudden exposure to a colder atmosphere as the exciting cause, may doubtless be attributed the bronchial inflammations which, of late years, have become so prevalent in our climate. The foundation of these, it is not improbable, is often laid in our schools; and the teacher will find in this circumstance, an additional reason to those previously suggested, for scrupulously attending to the temperature of the school-room.

The function of Respiration may be impeded by mechanical restraints, imposed in the school-room. Respiration is a conjoined chemical and mechanical process. The mechanical part of this process is dependent on the bones, cartilages and muscles of the chest, the diaphragm and the abdominal muscles. Any position or physical restraint that impedes the free play of any of these structures, impedes the function dependent on them; and, if frequently indulged or imposed, may permanently contract the thoracic cavity. By contraction of this cavity, the expansion of the lungs is prevented, the supply of oxygen and the exhalation of carbon diminished, the blood imperfectly vitalized, and the healthy development and growth of all parts of the body restrained. These consequences, and the coincidence of a narrow contracted chest with a feeble muscular development that incapacitates for the active duties of life, and especially, its relation as a predisposing cause to pulmonary consumption, invest this subject with great interest, and ought to excite the teacher to the utmost vigilance, and those who have the direction of school furniture to great care in its construction. There is a strong disposition in children, when long confined to the sitting posture, to the bent position,—the head inclining forward and downward toward the chest, the chest sinking down upon the abdomen, and the spine curved like a bow. Such a position, beside the injury it is likely to inflict on the spine of a child of delicate organization, opposes an impediment to the free action of every bone and muscle concerned in the function of Respiration. The injurious effect of this position will be greatly increased, if the scholar is suffered to read for any considerable length of time, while the lungs are thus disadvantageously situated; and it is proper here to remark that this exercise, as well on physical accounts as for reasons connected with its satisfactory execution, should always be performed in the upright position. The construction of desks and seats, and their relative height and distance from each other, may be such as to compel the scholar to assume awkward and inconvenient postures, and cause painful and injurious pressure on the chest; and should therefore be regulated in reference to those inconveniences.*

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* The nurseries and sleeping apartments of children require the same attention to preserve their atmospheric purity; and, for this purpose, should have daily, even in the coldest weather, a thorough ventilation.

Intimately connected with the organs of respiration, are the vocal and articulating apparatus by which we exercise the faculty of speech. With the development of these the teacher has much to do, and it will therefore be proper to spend a few moments on this subject. Speech is a compound faculty, resulting from the joint action of the organs of the voice and articulation. The vocal organs, collectively called the Larynx, are situated at the upper extremity of the windpipe, and are composed of several small cartilaginous bodies arranged in a box-like form, having a small aperture at the top, covered with a lid capable of opening and closing for the passage of air and the rejection of all other substances. This aperture is about ten lines in length, and, at its broadest part, two or three lines in width, and is capable of various degrees of enlargement by the action of muscles on the elastic cartilages which form it. It is by the changes in size of this aperture, the vibrations of the cartilages, the degree of elongation of the windpipe, and their combined action on the air expelled from the lungs as it passes through them, that voice and its various modulations are produced. In sounding what are called the high notes of the musical scale, the head is thrown backward, the larynx is contracted and its ligaments tense, the passage of the air quickened, the vibrations of the elastic cartilages increased in frequency, and the windpipe elongated. In the production of the low notes the head is brought down toward the chest, carrying the larynx with it, the ligaments are relaxed, the dimensions of the aperture are enlarged, the passage of the air slower, vibration less rapid, and the length of the windpipe diminished. These changes are effected by numerous delicate muscles; and the force of the air which is impelled through the organ is dependent on the motive powers of the organs of Respiration. The voice is variously modified by the changes of position of the throat, palate, tongue, lips, &c. These modifications belong to the subject of Articulation, and equally with the voice itself, are the result of muscular action.

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* The observations above made in regard to the impediments to Respiration, caused by improper positions and badly constructed school furniture, apply with equal, if not greater, force to mechanical restraints imposed by the fashion of the dress; and as this, with some other equally useful accomplishments, forms so large a part of the *studies* of some of our fashionable female boarding-schools, it will not be deemed out of place here to remark, that the parent who permits, or the preceptress who encourages the use of those abominable contrivances which have been invented to abridge the development of the female form, after all that has been written and said on this subject, cannot be regarded as guiltless of the disastrous consequences which result to the health and often to the lives of those who are incased in them.

From this condensed description of the mechanism of the organs of speech, the teacher will perceive wherein he may be of service in promoting the development of the faculty. He will see the necessity in all exercises of these organs, that the position of the pupil be such as will admit of the free motion of the windpipe, favour the play of the several muscles about the throat which effect the delicate movements of the laryngeal cartilages, and enable him to adapt the quantity and force of the air from the lungs, to the intensity and quality of the sound to be produced. For this purpose, he will take care that the scholar's feet are both firmly planted on the floor, so as to give steadiness to the bones of the pelvis, to which are attached the muscles of the abdomen that contribute so materially to the contractile motion of the pulmonary cavity; these muscles themselves should be neither carelessly relaxed nor contracted, but be put in a state of moderate tension to prepare them for promptness of action; the shoulders should be thrown back, and the chest advanced and expanded; the neck and head should be erect, that the windpipe may be in a medium state of extension; and the muscles of the throat generally, and those appropriate to the voice especially, perfectly free from restraint. If the exercise be that of reading, the book should be held about a foot in advance of the body, and sufficiently elevated that the eyes may command every part of the page without depression of the head. The pupil should be taught to fill his lungs well at the commencement of the exercise, and to regulate his breathing by the rhetorical pauses of the passage he is reading, taking short inspirations at the points indicating slight interruptions of the sense, and full inspirations at the close of a sentence. The use of the organs in this manner will tend greatly to their development and strength, and contribute much toward the attainment of excellence in the art of reading. Declamatory exercises and exercises in singing conducted with the same attention to attitude and the position of the organs, will be valuable adjuvants in the work of development; and may serve, by giving variety to the employments, to relieve the monotony of the school. The value of the last-named exercise, as a means of expanding and strengthening the chest, is not, as generally as it should be, appreciated in this country; or it would, as in Germany, occupy an important place among the occupations of all our schools. Care, however, should be taken, wherever it is introduced, not to overstrain the ligaments and delicate muscles of the vocal organs by efforts to elevate the voice to a higher pitch than its natural compass will warrant.

The education of the articulating organs ought not to be overlooked; and to qualify himself for the proper performance of his duty in this respect, the teacher ought carefully to familiarize himself with the position of the lips, tongue, palate, &c., appropriate to the articulation of every consonant and every modification of the vowel sounds. By so doing, he may be often able, while the youthful organs are yet pliable, to correct many habits of hesitancy, stammering, and vicious articulation and pronunciation, which, if neglected in childhood, may afterward prove unconquerable, and become sources of perpetual mortification and embarrassment.

IV. The function of Nutrition may be disturbed by the arrangements of the school-room.

By Nutrition, in the physiological sense of the term, is meant the process by which every part of the animal structure appropriates to itself the particles of nutritive matter, separated for the purpose from the general mass of the blood and suited to renew its substance. Development and growth are the result of the preponderance of the nutritive over the absorbent system, existing during infancy and childhood; at maturity these functions are more nearly in equilibrium. The external conditions which influence these functions, beside the food, are Exercise, which promotes the activity of the nutritive secretion, and Pressure, which opposes deposition and promotes absorption. The brawny chest and shoulders and the hard full muscles of the arm of the son of Vulcan, who earns his bread at the sledge and anvil, and the enormous development of the feet and ancles of opera-dancers, who amass such fortunes by performing antics with their lower extremities, are familiar instances of the effect of the exercise of particular muscles in promoting their growth: and the waste of both bone and muscle resulting, from the activity of absorption, to a fractured limb incased in mechanical contrivances which exert undue pressure on particular parts, is well known to every surgeon of experience and observation.

It is of incalculable importance that, during the period of growth, a child should be placed in circumstances the most favourable to the healthful performance of these functions. For this purpose, while care is taken that his clothing imposes no pressure nor restraint, he should be encouraged in his fondness for vigorous and sportive exercises; and in our cities and large towns, where fewer incentives to such exercises, and less favourable opportunities to indulge in them, are presented, than in the country, where the pure air and the whole aspect of nature invites to activity, provision should be made by parents and the governors of schools for such employments and amusements as will give buoyancy to the youthful spirits, and exercise to the limbs. As bodily symmetry and the equal development of all parts of the organization may be frustrated by the disproportionate use of the several organs, these employments should be selected with reference to their adaptation to call into action, as impartially as possible, every fibre of the muscular system. The different games of ball, which unite the vigorous use of the arms with various attitudes of the body, the pitching of quoits, leaping, jumping and climbing, are all suited to this purpose; and all school-houses and seminaries of learning,—especially if located in large towns—should be provided with spacious grounds, furnished with proper gymnastic appliances for the exercise of scholars and students in these sports during their hours of relaxation. The remark, it is hoped, will not, in this place*—the seat of a distinguished literary and theological institution,—be considered obtrusive, that these sports ought not to be esteemed as idle vanities by those, even, who have renounced the world and the things of the world, to devote themselves to preparation for the holy office. Care will be necessary in all these exercises, lest they be abused to the serious detriment of the scholar; and he should therefore be cautioned against unnatural positions, turning somersets, lifting heavy weights, jumping from great heights, and all efforts which employ the muscles when distorted from their natural direction, or with a degree of intensity disproportioned to their power of endurance. The demands of the system for physical exercise should receive attention from the teacher during the hours devoted to the intellectual occupations of the school, and these occupations should be so varied as frequently to change the positions of the scholar and give employment to his muscles. This will be especially requisite for the younger scholars, whose demand for physical activity is greater, and whose intellectual faculties are less fitted to endure long-continued mental occupation than those of children of more mature age.

Attention in these respects will tend greatly to counteract the evils arising from the unequal pressure which, under the most favourable circumstances, is sometimes inflicted on particular structures to an extent sufficient, in persons of delicate conformation, to induce serious deformity and disease. The melancholy increase of spinal distortion among young females, which there is reason to fear is too often the result of errors in our systems of education, enhances the importance of these suggestions, and makes imperative, on all concerned, greater attention to the construction of school furniture. "If a weakly girl of ten years old," says a distinguished medical writer, "be obliged to sit for hours on a narrow bench, without any support to her back, it is not surprising that, notwithstanding all the reproofs she may receive, she endeavours to relieve herself by allowing the lumbar vertebræ to sink to one side. This may itself be sufficient cause for the origin of a curve; but if the position in which girls generally sit while writing, drawing playing at the piano-forte, be taken into the account with the causes already mentioned, it will be admitted that it is scarcely possible for a girl thus situated, to avoid being crooked; particularly if she is not permitted to take such exercises as give tone and strength to the muscles of the spine." When from these causes this habitual position becomes established, an unequal pressure begins to be exerted on the processes and sides of the vertebral column. By a law of nutrition which has been referred to, this unequal pressure causes a gradual absorption of that side of the vertebræ on which it is made; and the distortion which was at first mere habit, now becomes an organic deformity. When such a condition has been induced, the progress of the disease is seldom arrested; and if arrested, the symmetry of the form is never restored. The proportion of females educated under the prevailing systems, in whom distortions of this kind are in various degrees manifest, is far greater than any one whose attention has not been specially drawn to the subject would imagine, amounting, according to the estimate of Dr. Warren, of Boston, to nearly one half of the whole number. The more vigorous constitution of boys, and of girls brought up in the country, renders them less liable to the ill effects of the errors of position under consideration, but even in them some degree of curvature is often discernible by the practised eye. To escape this, the most fatal physical evil connected with our systems of education, scholars, whether male or female, should be compelled, when reciting, to avoid the careless habit of poising themselves on one foot, and when occupied at their desks in writing, drawing or cyphering, the elevation of the right shoulder, and habitually leaning on the elbow or toward one side; and in order that relief from fatigue may be had, without resorting to these mal-positions, the seats should always be made with backs of an inclination and form adapted to the natural curve of the back and shoulders. The economy is as unpardonable which, on account of a few dollars additional expense, would deny to children conveniences so essential to health and comfort, as the reason for refusing them is miserable, that we ourselves were compelled to do without them.

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* New Brunswick, the seat of Rutgers College.

V. The condition of the skin, which ministers to one of the most important of the Excretory functions of the economy, may be influenced by the circumstances of the school-room.

The circumstances which modify the action of the cutaneous emunctories are Dress,* Personal Cleanliness,† the Temperature and Moisture of the Atmosphere. With the first two, parents have much more to do than the teacher; though the latter, by his suggestions, may exert a good influence on the former, when, as is too often the case, they are not properly enlightened or heedful in regard to the influence of these conditions on the health and comfort; and, by adopting regulations in regard to cleanliness, which so far as they concern the exposed parts of the body he may well do, he may render valuable service to the physical as well as the moral welfare of his pupils.

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* The dress of children should be regulated by two considerations,—protection against atmospheric vicissitudes, and the avoidance of improper pressure and restraint. In regard to the first, while care is taken that the clothing is always sufficient for comfort, it should not be so great in quantity as to render active exercise unnecessary or inconvenient, for the reason that the warmth induced by a vigorous circulation is more healthful than that which is secured by means of furs and tippets and cumbrous overcoats. These are not, of course, to be wholly discarded; but their usefulness will be greatly increased, if they are resorted to only in the most inclement weather, or when bodily activity is impracticable. In regard to the second point, it will be proper that every thing like a ligature should be avoided; garters, wrist-bands, and neck-bands should cause no pressure, and if waistbands and belts are used, they should be fitted to the chest in the expanded and not in the contracted state. There is more danger on this point from the clothing of girls than of boys; it being in the dress of the former that fashion reigns with most despotic sway, suggesting exposures and imposing restraints which exert a most unhappy influence on the physical health and development. One of the evils from this source has, in another place, been adverted to. The wearing of dresses cut very low in the neck, is another of no less magnitude; the exposure, thus caused, of a large and peculiarly sensitive surface to atmospheric changes, often exciting tubercular consumption; and the fit of the dress to the shoulders below their centre of motion,—by embarrassing the movements of the arm and retarding the development of the muscles concerned in those movements which, being attached to the spine, serve to sustain and strengthen it,—adding another to the causes of spinal distortion. These considerations—themselves sufficient for the guidance of reasonable mothers—when taken into the account with the small inducement there can exist, in an undeveloped girl, for the exhibitions which this form of dress seems designed to favour, ought to secure its banishment from the juvenile wardrobe. A recent writer has urged similar objections to the manner in which the shoulder straps of the under garments of children are fitted to the arms.

† Frequent ablutions of the whole body is indispensable to the healthy condition of the functions of the skin, and it is matter of congratulation that so much attention has been lately paid to the provision of the means of general bathing among the conveniences of the household. Warm and cold bathing have each its advantages. For the purposes of cleanliness, the removal of impurities and relaxing the exhalents of the skin, the former is preferable. For the purpose of invigoration, the cold bath, on account of the reaction which follows its use, is more suitable. There is danger, however, in these days of extravagant fondness for new systems, of falling into hurtful extremes; and the indiscriminate advocacy of cold bathing and cold swathing as remedies for all imaginable phases of disease, like some other absurdities of German invention, is likely to lead to very pernicious consequences. In constitutions in which there exist predispositions to organic disease, feeble powers of reaction, or strong local determinations, cold bathing is manifestly improper; and as these cannot always be ascertained by the parent, it would be safest, before subjecting a child to the daily shock of the cold bath, to have the counsel of the family medical adviser. A bath varying from warm to cool, *i. e.*, from 98° to 74°, according to the vigour of the constitution, may ordinarily be used with great benefit; care being always taken that it be continued but for a few minutes at a time, be followed by no unnecessary exposure, and that the surface be well rubbed and dried before the clothing is resumed.

The condition of the atmosphere of the school-room, with respect to heat and moisture, are more directly under his control. The effect of extreme heat on the mucous surface of the bronchi and air-cells of the lungs has already been described, as has also its influence in exciting the circulatory organs and relaxing the muscular systems. Beside its pernicious effects in these respects, by causing a rapid evaporation of its moisture, it stimulates the cutaneous surface, increases the insensible perspiration, exhausts and debilitates the vessels which supply it, and incapacitates the system to endure, without injury, subsequent exposure to a colder atmosphere, and the suppression of perspiration consequent thereon. These morbid results will be aggravated, if there exists at the same time a deficiency of moisture in the air of the school-room. Such a deficiency may exist without any unhealthful elevation of temperature; and so great is the affinity of the atmosphere for water, that whenever not saturated with its vapour, it will abstract moisture from all subjacent bodies in which it is contained. When, by the combined action of the heat and dryness of the air, the skin and mucous surfaces are brought into this state of exhaustion and susceptibility—especially if there is superadded the nervous and muscular depression which results from tedious study and uncomfortable positions—the scholar could not go out into a cold, damp, winter atmosphere, without imminent hazard of severe inflammation of the lungs and its investing membrane, rheumatism or visceral disease. These considerations will suggest to the teacher, reasons why he should pay some attention to the physical condition of a scholar when he permits him to go out into the cold air; and additional inducements to those heretofore presented for free ventilation, and also for the provision of suitable means to preserve the necessary degree of humidity.

The question has been asked, "Does any advantage arise from the evaporation of water from dishes placed upon the stove which warms the school-room?" and its necessity has been doubted, on the ground that heat does not, as the popular language expresses it, *dry up* the moisture of the atmosphere, but merely expands its volume. The effect of caloric upon the air is to increase its capacity for humidity. This increased capacity will seek its supply from all bodies within its reach. If there be no other source of supply, the fluids of the human body will be drawn upon to furnish it. The external air, admitted into a heated school-room, by mixing with its atmosphere will, in some degree, diminish the capacity for moisture; but being cold, and therefore not containing much humidity itself, it will not materially increase the supply. From the evaporation of water (ebullition is not contemplated) there can arise no injurious excess, for where the capacity of the air is filled with moisture, it will hold no more. There is then no valid objection to this evaporation, if the water and the vessel containing it be pure; while there is abundant reason why it may prove advantageous. The teacher will, therefore, do well to provide for it.

Thus far, the influences which, in the school-room, may affect the organs concerned in what may be called vegetative life, have been the subjects of consideration. And here it might be proper to arrest remark on the influence of the conditions of the school-room, to discuss the various methods of constructing and furnishing them so as effectually to avoid or mitigate the evils to which allusion has been made; but, as that subject has been assigned to a committee of gentlemen more practically acquainted with such details, the remainder of this essay will be devoted to some observations on the means of developing, and guarding from injury that part of the human organization more directly concerned in the occupations of the school-room. It will, of course, be understood that reference is here made to the organization which is connected with the intellectual faculties.

In regard to the nature of the intellectual principle, physiological and metaphysical science equally leave us in darkness. From the only source capable of enlightening us we learn that the mind is immortal. Being immortal, it is therefore spiritual and immaterial, and consequently, not subject to the accidents of the physical system. Death, decay, disease, and, strictly speaking, growth and development cannot, therefore, be predicated of it. But, though unsusceptible, in itself, of injury from the intensity of its own action, or from the direct application of external forces; yet, dependent as it is, for the maintenance of its relations with the external world, on its connection with a physical organ, its manifest ations, both in degree and kind, are governed by the condition of that organ in regard to health and development. The direction of the circumstances which may promote or retard the healthy development of the brain, or injure its texture becomes, therefore, an important part of physical education.

The various conditions of the school-room, which have been already adverted to as influencing the other vital functions, exert a similar effect on the physical health of the brain. Thus, great heat produces cerebral exhaustion, mental lassitude, and indisposition to studious effort. Vitiated air induces nervous debility, headache, giddiness, fainting, and, if long inspired, congestion, convulsions and finally, apoplexy and death. Pure air, of moderate temperature, conjoined with habitual exercise and the general influences which favour the growth of other organs, imparts a healthful stimulus to, and equally promotes, the development of this.

Physical exercise is of especial importance as a means of maintaining that equilibrium of the nervous and muscular systems which is necessary for the healthy performance of the brain's functions. The stimulus to muscular activity is derived from the peculiar principle which is conveyed along the nerves, from the brain to the muscles or organs of motion. When the amount of muscular activity is adequate to the expenditure of the regular supply of this stimulating principle, a state of equilibrium exists which is most favourable to the healthy condition of both; when it is either greater or less, the healthy state of both is disturbed. If the muscular activity has been excessive, nervous prostration and mental languor are the consequence; if it has been insufficient to expend the supply of the nervous influence, the latter accumulates and exhibits itself in that incapacity for continued attention, that general uneasiness of body, and those irregular movements of the face, feet and hands, which, in our expressive vernacular, have been called "the Fidgets." Every school-master has been annoyed by this nervous condition of his pupils, and been sometimes sorely perplexed to know how to overcome it. His best remedy will be to send the boy on some distant errand, and require him to return within a period so limited that he will be obliged to exert himself to accomplish it; and if any considerable number of his pupils are so affected, let him employ them a short time in some exhilarating gymnastic exercise, and he will both enliven them and provide an outlet for the excess of sensorial irritation.

The exercise of the organ itself in its appropriate functions is, however, the most effectual means of the healthy development of its powers; and the direction of the modes of this exercise will demand the employment of the most consummate skill and discretion on the part of the teacher.

He will find it necessary, in the first place, to adapt the intellectual exercises of his pupils to their respective ages. To do this, he ought carefully to acquaint himself with the facts that have been ascertained in regard to the natural order of manifestation of the mental powers, and the periods of life at which they are respectively evolved. These will be to him indications of the kind of intellectual activity which the texture of the organ, at these different periods, is able to bear; and, by following these indications, and directing the studies of his pupils in accordance with them, he will be assisting nature in the work of development, and may feel sure that he is doing no violence to her established laws. The faculty which gives earliest signs of development is that which takes note of external forms and sensible properties, and as these constitute the sources of a large part of human knowledge and furnish much of the material for thought and reasoning in the subsequent periods of life, the child who is employed in cultivating the perception of them, although he open not a book, learn not a letter, nor commit a single line to memory, is giving development to his organization and improving an important intellectual faculty. This faculty is the one to which cultivation should be first addressed, and it may be the one principally employed during the first two or three years of the child's pupilage. During the latter part of that period, it may be made subservient to the acquisition of the knowledge of the alphabet, and, with the aid of the memory and the faculty of association, which soon follow in the order of manifestation, to the learning of words and the names of things. While this and its associated faculties are thus under cultivation, it is not necessary that the child be immured within a school-room. The nursery, the play-ground, the open field, the beautiful things of nature, and the curious works of art, will all furnish abundant and appropriate objects for its exercise; and it would be well for his physical health, and not less for his intellectual, if, for the first seven years of his life, the school-house, with its books and irksome restraints, were to him a thing unknown. Soon he will show a desire to understand the qualities and uses of the objects of his perception, and this desire may be made available to interest the attention and moderately exercise the reflecting faculties in the discovery of the more simple relations. During the three or four years next following, such studies as will serve to impart elementary knowledge, furnish the mind with facts, strengthen the memory, give fixedness to the attention, and inculcate correct moral principles, will be found best suited to the state of mental development; and the teacher should bear steadily in mind that, at these early periods, the reflecting faculties are very imperfectly evolved, and that, although they may and ought to be called into moderate activity, they should not be employed in exercises requiring intense application, or long-continued abstract thought. Exercises of this kind should be deferred until the concluding years of the term of education, when these faculties are approaching maturity, and when the greater firmness of the brain's texture will better endure such severe discipline. When this period arrives, the teacher ought to inform himself of the modes of action of the reflecting powers, and direct the employments of his scholars to the proper cultivation of each and the complex exercise of them all. For this purpose, the pupil should be taught to compare, analyze, search out causes, trace relations, and deduce conclusions; and the greater part of his time should be now employed in exercises suited to perfect these exalted faculties which elevate him to the high rank he holds in the animate creation. The teacher makes a grand mistake who thinks he has discharged his whole duty, when he has qualified the youth committed to his care to enter college with respectability, or fitted them for the various business pursuits of life; he even falls short of his solemn obligation, if he satifies himself with storing their minds with all kinds of scientific knowledge; his responsibility is never fully met until he remembers that he has under his care a being endowed with a principle of immortality, possessed of the powers of thought and of reason, and having wants and aspirations which the utilitarian occupations of life can never satisfy; and remembering this employs, at the suitable age, the proper means to develop the higher faculties of his nature, and fit them to minister to those pure and refined pleasures which contribute so much to his happiness as a rational creature.

In the second place, the teacher should adapt his intellectual exercises to the capacities of his pupils. The old doctrine of the congenital equality of mental endowment is well nigh exploded, and every discriminating teacher will daily discover evidence that it ought to be. Now, he will find a scholar, whose high nervous development disposes and prepares him to pass, with a bound, over the field of knowledge, and reach its utmost goal, while another is girding himself for the race: the next moment, he will find an organization so feeble, that the simplest tasks are accomplished with the most laborious effort. The one will need to be taken kindly by the hand, and led on by the slowest processes of mental induction,—the crooked places being made straight, and the rough places smooth before him: the other will require the strongest restraints and the severest discipline of his reflecting faculties to curb the impetuosity of his impulsive genius. In every school, will be found the different gradations between these extremes. It would be the utmost of folly to attempt to do justice to all these, by the same course of mental training; and hence arises one of the greatest evils of the systems of classification too exclusively relied on in our colleges and most of our schools. Under these systems, the pupils are kept at arm's length from the teacher, and can rarely receive the benefit of that intimate personal instruction and intercouse which alone is fitted to evolve their diverse faculties. This may be called Education, but it has scarcely a genuine feature of true development about it.

> "—— 'Tis the forced march of a herd of bullocks
> Before a shouting drover. The glad van
> Move on with ease, and pause awhile to snatch
> A passing morsel from the dewy green-sward,
> While all the blows, the oaths, the indignation
> Fall on the croup of the ill-fated laggard
> That cripples in the rear;"

and the human animal, no more than the brute, is benefited by the infliction.

This wholesale mode of instruction, if not entirely superseded, must be greatly modified by a system which contemplates the adaptation of the intellectual discipline to the peculiarities of each pupil, before our schools can discharge fully the duty which devolves upon them. That this may be done, the teacher should not be satisfied with a general estimate of the relative capacities of his scholars, but bearing in mind that, as strongly marked as is the diversity of general endowment in different children, the unequal development of the various faculties of the same child is no less so, he should carefully analyze the mental constitution of each pupil, and discover the relative strength of every faculty; so as by a wise direction of his mental exercises to repair his constitutional hebetudes and restrain his redundancies. Thus, a dull apprehension may be quickened, an infirm memory be strengthened, a torpid imagination aroused, or a fervid fancy chastened, feeble reasoning powers invigorated, and a vacillating judgment and will rendered firm and unwavering. The development and cultivation of these, so as to produce an intellectual character harmonious and well balanced, constitute the great business of the instructers of our youth. The infusion of scientific knowledge, to which parents and teachers attach such paramount importance, is of insignificant value when compared with it; and the school and the college which shall send forth from their walls men well disciplined in these, will render a more valuable service to the country than they possibly could do were they to stuff their pupils' brains with the lore of centuries. The want of men of true intellectual balance, and of that sterling common sense which is its invariable attendant, is the crying defect of our age, a defect which is seriously felt in all the departments of literature and opinion; and if they, who are charged with the business of disciplining and indoctrinating the forthcoming generation, are not more faithful or more successful than have been their predecessors, the established truths of ages, which even now can scarcely maintain their ground against the incursions of the imaginative, the speculative and the marvellous, will be in danger of utter subversion by the charlatan and the heresiarch.

In the third place, the teacher should adapt his intellectual exercises, in some degree, to the bent of the natural inclinations of his pupils. Of course this remark is not intended to apply to indolent habits and dispositions, but to intellectual tendencies. Nature often points out by very intelligible indications the kind of pursuits to which the mental conformation of the individual is best adapted; and if the cultivation and regulation of the faculties appropriate to those pursuits are not attended to, her plain teachings are disregarded, and an injustice is done to the pupil, which may exert a disastrous influence on his future life. His habits of study may be seriously injured by this neglect. Teachers often experience difficulty in fixing the attention of their pupils. This, it is of great importance to concentrate and strengthen. Truancy of this faculty is frequently engendered by injudiciously compelling the scholar to intellectual exercises which are distasteful and unsuited to his mental capacities. If such studies should be temporarily intermitted, and superseded by others of a more congenial nature, the faculty might be more surely arrested and employed; and, being thus developed and invigorated, might then be more advantageously directed to other and various departments of mental labour.

On the other hand, in the fourth place, the teacher should be careful not to give to the employments of his pupils a direction too exclusively toward their favourite tastes. A prudent regard to the encouragement and improvement of the natural genius is, for the reason just stated, judicious and useful; but the scholar must not be left so entirely to the bent of his inclination as to neglect the proper cultivation of his other faculties. A person so educated would be likely to grow up to "a man of one idea," limited in his aims and in his sphere of knowledge, narrow in his views, undisciplined in the application of his reasoning powers to the various duties of life, and indifferent to every thing disconnected with the subjects of his peculiar taste. If his inclination be toward the study of the abstract sciences, in which all the higher intellectual powers become stretched to their utmost tension, the unpleasant habit of abstraction may be the consequence; and though this is not a common state of mind during pupilage, the natural inclination may be then so cultivated as ultimately to establish it.

But, while thus employed in directing the occupations of his pupils to the development of their powers, the teacher should not forget that the brain which manifests them, in order that it might be adapted to its great office, has been endowed with a higher organization than any other part of the human structure; that in proportion to the degree of organization is the liability to injury; and that the period of youth, when its texture is most delicate and the susceptibilities most vivid, is that when the foundation of serious cerebral disease is most likely to be laid. The injuries to which this organ is liable, except such as are caused by the application of external forces and corporeal sympathy, generally arise from too great exaltation or too great exhaustion of the sensorial power. Both of these conditions may have their origin in ill-timed, ill-directed, too intense and too long protracted study. The effect of the latter of these conditions will be seen in the impairment of the intellectual faculties, general or partial, and the supervention of a species of mental imbecility; of the other, in cerebral excitement, headaches, disturbed or entire loss of sleep, abstractions, reveries and various other symptoms betokening high nervous irritation. These disturbances, if perpetuated by the constant indulgence of the habits which provoke them, become sources of excitement to the arterial system. This, obedient to the stimulus that excites it, drives the blood with increased force and quantity to the suffering organ, and fever, ephemeral or protracted, ensues; or perhaps inflammation, structural lesion, insanity, and even premature death, may be the melancholy consequence. Even although these extreme sad results may not ensue, the equilibrium of the nervous and muscular systems is destroyed, the brain is over-nourished at the expense of other vital organs, the physical health is undermined, the body pines, and the mind itself is "sicklied o'er with the pale cast of thought," and unfitted for "enterprizes of great pith and moment."

The considerate teacher will see, in this train of evils resulting from excessive mental exertion, how imperative is the duty which devolves on him, in the fifth place, so to regulate the intellectual exercises of his pupils as not unduly to exalt or exhaust the sensorial power. Let it not be said that this is an unnecessary caution, because serious injury of the brain from excessive study is a rare occurrence among school boys. The "intellectual Numen" often erects in the sensorium of the youthful scholar an altar whose fires, if too sedulously maintained, may slowly consume the vital properties of the etherial principle that pervades the temple in which it is enshrined; and though the progress of this exhausting consumption may not be immediately perceptible in the physical condition of its victim; yet, in after life,

> "—— the aching eye,
> The pallid cheek, the trembling frame, the head
> Throbbing with thought, and torn with agony,"

will tell the sad tale of uncontrolled youthful ambition, and furnish melancholy evidence of the truth of the inspired apophthegm, "much study is a weariness of the flesh." When the teacher finds, among his pupils, a youth bearing the marks of the temperament which distinguishes those of whom it is said that "the mind banquets while the body pines," who prefers to elaborate a mathematical problem, or search out the hidden meaning of an abstruse classical author, rather than engage in the amusements of his youthful companions, he will inexcusably fail of his duty to the pupil, his parents and society, if he does not often drive him from his books, and administer all the provocatives to physical effort in his power. The literary world is full of men of brilliant genius and high principle, who might enlighten and bless mankind by their contributions to his intellectual and social advancement, whose lives, in consequence of such neglect, are a burthen to themselves and almost a blight on the happiness of all who surround them.

In the sixth place, the teacher will, in the evils to which reference has been made, see reason to diversify his intellectual exercises and afford suitable opportunity for mental rest. Whatever are the opinions entertained of the unity or multiplicity of the brain's organization, it is very generally conceded that mental fatigue is relieved by change of study; and that, by its cessation,

"——the understanding takes repose
In indolent vacuity of thought,
And sleeps and is refreshed."

That the scholar's mind may have the full benefit of this source of mental relief, and that the body be not deprived of its proper amount of exercise, may it not be worthy the consideration of teachers and parents and friends of education, whether the present practice of requiring the commission of long lessons to memory out of school hours cannot, with propriety, be abandoned? Surely, if the six hours usually spent in the school-room are faithfully employed in occupations adapted to expand and discipline the mind, the remainder of the pupil's wakeful time may be left for the healthful exercises which are so necessary to develop his physical frame, and for the enjoyment of the cheerful converse of the domestic fireside, which may be made to minister so much to the cultivation of right affections and the elevation of the social virtues. For the loss of these, the short-lived precocity of the memory, which is all that is generally secured in the exchange, is but a miserable compensation: and if, as this exercise approaches its conclusion, I may for once use the first person singular, I would implore parents and teachers, as they value the health, as they value the intellects, as they value the lives of the children whom God has committed to their guardianship, not to sacrifice them all at the shrine of a cruel, a murderous ambition.*

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* Besides overtaxing the brain, the requirement of night lessons is attended by other evils; among which are injury of the eyes from study by candle-light, and the encroachment on the hours which should be devoted to sleep. There is no principle more universally concurred in by physiologists than the necessity of the growing child for a much larger amount of sleep than the adult; and no parent, who properly regards the health of his children, will permit any trivial circumstance to induce him to violate it. But night studies, even if not protracted beyond the proper hour for seeking rest, are otherwise injurious. Sleep, in order entirely to recruit the exhausted powers of nature, must embrace in its influence both the cerebral and bodily organs. The brain that is kept on the stretch till the moment of retiring for the night, if not the means of postponing the advent of slumber to the bodily organs, will be unlikely with them to fall readily into inactivity and repose; the sleep that is enjoyed will be fitful and dreamy, and the morning will find the subject, be he child or adult, unrefreshed, nervous and irritable. Such a condition, if habitual, can be healthful neither to mind nor body.

Finally, the teacher ought to remit the studies of a pupil, when he exhibits any appearance of ill health; and more especially, if the head in any degree sympathize with, or participate in the disorder of the functions of other organs. Study, under such circumstances, is of little avail; while the increased determination of the blood, which the excitement of the brain consequent on study, invites to the organ, will add to the disturbance, and may induce local disease. The teacher should not permit the fear that he may be imposed upon by an indolent pupil, to lead him to the commission of an act of injustice or to the infliction of cruelty. He should rather adopt the merciful maxim of the law, and hazard the escape of the guilty, than impose unmerited punishment on the innocent.

These remarks, without exhausting the subject, must close this essay. The suggestions which have been made, are believed to be of vital consequence to the physical and intellectual well-being of the youth who are growing up to perform their part on the stage of human action; and it is sincerely hoped that they for whose consideration they have been prepared, and whose responsibilities to God and their country are not exceeded in magnitude by those of any other profession of human institution, will weigh well their import, and derive some small benefit from their presentation.

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